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ABSTRACT

This program is called Project ASSIST. ASSIST is an acronym for Alternative Strategies and Services for Improving Science Teaching. ASSIST is involved in teacher education (both inservice and preservice), student programs, and community relations. The model consists of five levels: (1) the coordinating staff; (2) the consulting and advisory groups; (3) research and development; (4) programs; and (5) the regional centers. Service possibilities characterizing this project include coordination of programs, educational needs assessment, curriculum and program development, and an instructional materials center. The major activity of ASSIST has been the assistance provided to schools for directly implementing or revising major science curriculum programs in Iowa schools. (Author/BB)

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A MODEL SUPPORT PROGRAM FOR THE IMPROVEMENT OF SCIENCE TEACHING

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A MODEL SUPPORT PROGRAM FOR THE IMPROVEMENT OF SCIENCE TEACHING

Project ASSIST is a concept for statewide improvement of science education in the State of Iowa in the United States. ASSIST is an acronym for Alternative Strategies and Services for Improving Science Teaching. Cooperation among the various agencies and persons involved with education in Iowa is central to the Project ASSIST concept. Although the physical headquarters for Project ASSIST is located as part of the Science Education Center at The University of Iowa, the three other universities are also directly involved. Representatives from all twenty-six private colleges in Iowa with teacher education programs are a vital part of the pre-service improvement effort as well providing some staff for in-service programs. Personnel from the State Department of Public Instruction have been directly involved in all phases of the development of the Project ASSIST concept and its operation from 1973 to present. The fifteen Area Education Agencies (A.E.A.) are central in terms of coordinating regional activities, providing communication with schools, and providing sites for meetings and workshops. In many instances the A.E.A. units employ coordinators of science, mathematics, and social studies. In some cases the larger school systems with subject area coordinators provide similar services for their specific districts.

Project ASSIST is a mega-concept in that it attempts to consider educational improvement efforts at all academic levels and in all facets of society. Schools represent a primary means for affecting society as a whole, while being supported financially by the society. Hence, the involvement of all people in Project ASSIST is a central goal for the concept. Schools mean people -- teachers, counselors, administrators, to be sure -- but most of all schools mean students who represent the total of society. There are three major areas of the ASSIST thrust. These include teacher education (both in-service and pre-service), student programs, and community relations. At the ASSIST headquarters a materials center and a center for evaluation are primary activities in addition to the administrative framework for the effort. Figure 1 represents a pictorial view of Project ASSIST -- a model for improving science education in Iowa.

The model consists of five levels: 1) the Coordinating Staff, 2) the Consulting-Advisory Groups, 3) Research and Development, 4) Programs, including Teacher Education, Student, Community Related, and 5) the Regional

Centers. The level relationship is designed to indicate a flow of information, ideas, and needs from the regions into the coordinating staff, who act upon the suggestions of the consulting-advisory groups and direct the regional information to the research and development team. The research and development group assesses, plans, and directs implementation; develops soft and hardware supplies; provides curriculum materials; and evaluates the programs that are designed regionally. At any point in time regions can elect involvement with the programs indicated at the fourth level.

The major concepts and service possibilities characterizing Project ASSIST, a model for science curriculum improvement, can be outlined as follows:

1. Coordination of Programs. Rather than to continue the operation of a number of isolated science education programs by various institutions throughout the state, Project ASSIST establishes a consortium for the purpose of restructuring approaches to common problems. The increased communication and manpower that stems from much cooperation make possible a much more dynamic and effective science program for the schools of Iowa.

2. Regional Involvement. That persons closely involved with students and classroom activities should play a major role in the development of any new approach to a more effective science program has been a basic premise of Project ASSIST. Planning occurs in the respective regional centers thereby insuring a closer congruence between program development and the critical needs of the schools within a specific region.

3. Cooperative Effort. The institutions of higher learning through government funding, the intermediate units (A.E.A.'s) with pulic funding for special services to schools, and the local schools through their regular instructional and curriculum development budgets cooperate financially and professionally in the planning and implementation of new programs or the restructuring of those now in existence. This cooperation includes the following phases of development:

a. Educational Needs Assessment teams comprised of local school representatives, A.E.A. staff, and university evaluation specialists cooperate in conducting thorough assessments of the critical education needs within given geographic regions. These, together with an assessment of the physical and financial limitations within which specific schools must operate, serve as the basis for 1) determining program objectives, 2) evaluating the effectiveness of existing programs, and 3) proposing curricular changes.

b. Curriculum and Program Development. With the help of university consultant services and in-service programs housed at respective regional centers, the selection, adaptation, or development of curricula follow. These incorporate the recommendations of the needs assessment team in order to provide a program suitable to the specific school for which it is designed. The establishment of regional centers for curriculum development, adaptation, and school implementation has the advantage of providing assistance from a nearby consortium member.

4. Self Sustaining Development. The regional center functions to provide continuous reassessment, replanning, and consultive services over the years which ensures continuously viable and up-to-date science programs. As federal funding declines, the efforts continue as a normal part of the operating budgets of the A.E.A.'s, consortium institutions, and local schools. Here the centers provide invaluable sources of data for researchers, opportunities for pre-service internships, and a continuing close-working alliance between universities and schools, thereby enabling local schools to reap a much fuller benefit from their university resources in terms of continued consultation and in-service education.

5. Instructional Materials Center. Included in the preliminary concept of Project ASSIST was the establishment of an instructional materials center at The University of Iowa. Here, those materials determined essential for program implementation are assembled or manufactured and disseminated at the lowest possible costs. Since the materials center works in response to the needs of Iowa schools as reported by assessment teams, an efficient system of material supply is developed for the maximum benefit to participating schools.

Project ASSIST was an outgrowth of training programs for preparing science and mathematics supervisors conducted in Academic Year Institutes (AYI) at The University of Iowa during 1969-72. The 1973-74 AYI program was changed into a Leadership Development Conference (LDP) with encouragement by NSF staff aimed toward initiating a systems or comprehensive project for Iowa. The LDP funding was critical in promoting the dialogue, the effort, the agreements that led to Project ASSIST. In 1974 a new program, Instructional Improvement Implementation (III), was established by NSF. Project ASSIST was funded during 1974-76 as the largest single III project funded each year. The funding as an implementation activity during 1974-76 resulted in significant

numbers of schools and teachers becoming involved with awareness conferences and workshops designed to assist with implementing one or more of the national programs. During the 1973-76 period the total NSF funding totaled nearly $600,000. Such funding for K-12 in-service teacher education activities was curtailed by NSF during 1976-77 because of problems with curriculum development and use of federal funds for teacher education exclusively for curriculum implementation activities. It was because of this suspension of NSF programs that Project ASSIST was continued with a direct appropriation by the State Legislature in Iowa. A total of $90,000 was added to the annual budgets of the Science Education Center to support the Project ASSIST staff and materials. As NSF funding resumed on a limited basis in 1977, additional NSF support for a local ecology project has continued. Project ASSIST as an integral part of the Science Education Center is now called Iowa-ASSIST as a designation paralleling other on-going programs in science education in Iowa.

The major activity of Iowa-ASSIST has been the assistance provided to schools for directly implementing or revising major science curriculum programs in Iowa schools. Initially the program has provided more assistance with implementing science programs in elementary schools than in secondary schools. Major programs which have been emphasized include ESS, SCIS, SAPA, USMES, MAPS, and Science 5/13.* Secondary programs in which assistance has been provided include ISCS, IPS, TPE, IAS, and ISIS.* Assistance has been provided in the areas of mathematics and social studies as well. In addition, a K-12 Environmental Studies Program developed by Iowa-ASSIST personnel has proven to be a desirable supplement to existing courses and programs.

Staff teams for each curriculum program are formulated. Each of these teams is headed by a professor from The University of Iowa and includes local supervisors, key teachers, curriculum representatives, and professors from other colleges and universities (who are formally named University Lecturers).

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*NSF projects cited are: Elementary Science Study (ESS), Science Curriculum Improvement Study (SCIS), Science -- A Process Approach (SAPA), Unified Science and Mathematics for Elementary Schools (USMES), Modular Activities Program in Science (MAPS), Intermediate Science Curriculum Study (ISCS), Introductory Physical Science (IPS), Technology-People-Environment (TPE), Interdisciplinary Approach to Chemistry (IAC), and Individualized Science Instructional System (ISIS).

Typically the progression of activity begins with an Awareness Conference (usually for administrators and key teachers). Following such conferences, meetings with local teacher groups, community leaders, and central administrators is held after a decision to adopt a given program is made. After such a decision teachers are invited to participate in a special in-service instructional program. Such a program includes a summer introductory workshop (usually two or three weeks in length) which are held at the regional center. Such workshops are designed to provide an introduction to the content, the organization, and the teaching strategies which characterize a given program. Following the summer workshop, a series of in-service meetings (usually six sessions each semester are scheduled each for a duration of three hours) are planned. In addition, school intervisitations, staff visits, and meetings in individual schools all represent informal instructional strategies utilized. The use of the new materials in classrooms with students is central to the academic year phase. Such classrooms represent the "laboratory" for the courses(s). Typically each teacher participant earns six semester hours of graduate level credit for the summer and the academic year sequence. In some instances the academic year program is waived if the implementation effort does not require it.

An important component of Iowa-ASSIST is the assessment and evaluation activities. A survey of national curriculum use in Iowa was conducted in 1974 as a part of the LDP funding. The results of the follow-up study conducted in 1976 at the end of major NSF support for the implementation effort indicate that major numbers of schools and teachers have been affected. Table 1 provides information concerning teacher contacts as a result of Project ASSIST. It is apparent that the number of teachers affected has steadily increased during the five-year period.

ASSIST effects upon specific elementary programs are considered during the 1972-76 years in Table 2. Schools involved, teachers enrolled, and students affected are viewed cumulatively for four programs in addition to a miscellaneous category. It is apparent that ASSIST workshops produce significant effects. Of course, it is apparent that this impact in terms of specific curriculum implementation has decreased since NSF funding exclusively for this purpose. (Note decreases for specific curriculum workshops during 1976-77 in Table 1.) Current studies are in progress regarding another issue related to relative success of the implementation and changes one, two, and three years following a given curriculum implementation in a school (Sheldon, in press).

The ASSIST evaluation effort has resulted in the collection of much data concerning the implementation strategies. Significant content achievement has been measured in students in each workshop concerned with each curriculum program (Wilson, 1976). Analysis of audio-tapes has revealed that students have developed significantly in terms of their ability to practice inquiry skills (Chang, 1977). Participants have grown significantly in terms of their perceptions of the nature of specific curricula and the approaches recommended in them (Wilson, 1976). Measurements have illustrated significant changes in affective areas as well (Wilson, 1976). There is considerable evidence to suggest that Iowa-ASSIST has been successful in changing teachers, their perceptions, their approaches to teaching science, and their knowledge. Follow-up studies continue to measure impact over a period of time.

Follow-up activities concerning continued use of the new programs have revealed further success of the project (Wilson, 1977). Other studies of the effectiveness of awareness conferences for teachers and administrators have also illustrated lasting improvement (Sheldon, in press and van den Berg, 1977).

Successful or effective implementation of national science programs is equated to continued use, expressed satisfaction with the program, and continued change and growth. After five years with Project ASSIST as a mechanism for implementation of national programs, a series of generalizations are possible. These observations may be important for others planning to develop specific programs or strategies to foster more successful curriculum implementation. The Project ASSIST experiences in Iowa permit the following general observations:

1) Longer periods of support, association, and assistance result in more effective implementation;
2) Involvement of local administrative and supervisory staff in implementation process enhances its success;
3) Continued contact (visits, seminars, and newsletters) with implementation staff enhances success -- seems to be form of recognition;
4) Encouraging teachers to adapt, expand, alter any curriculum results in continuing success and growth;
5) Practice with self-evaluation causes more change and successful development/implementation -- continued growth;
6) Involvement with teachers in curriculum development/implementation results in more of them pursuing further graduate work;

7) Staff teams during implementation program enhances cooperation and chances for success (college, A.E.A., curriculum development, university);
8) Multiple teachers involved from a single school enhances implementation;
9) Concern for vertical curriculum planning (more than single grade level) results in more success than implementing material for single course (broader view -- less discipline centered);
10) Involvement of teachers and leaders during summer period (one day to three weeks) while free of other duties and responsibilities results in more effective implementation than in-service efforts during academic year (even better... when summer followed by contacts, seminars, etc. during academic year);
11) Teacher and school involvement with curriculum evaluation and research tends to enhance implementation;
12) Implementation efforts designed for helping with solving perceived local issues tends to be more successful than those designed for gaining use (discipleship) for given curriculum (perhaps it's only the developer that perceives a given program as an innovation);
13) Implementation enhanced when consultive assistance and exemplary (as well as inexpensive) materials are readily available;
14) Involvement of in-service teachers in special programs for the gifted and the handicapped -- as team members -- enhances further cooperation including research and continued curriculum improvement;
15) Involving in-service teachers as full partners in pre-service programs enhances curriculum development/implementation.

Evaluation of program effectiveness continues. New parameters are identified as the program changes each year. ASSIST as a major curriculum implementation model operated best during the 1974-76 period with direct NSF support for that purpose. Although ASSIST continues as a general improvement program affecting large numbers of schools, teachers, and students, it is less effective as a curriculum implementation mechanism per se as new forces, new needs, new perspectives emerge. Although the expanded model is exciting and attractive, a lesson with respect to curriculum implementation is obvious. If such a program is to operate in a given geographical area, outside funding keeping the model in focus as well as providing recognition for schools and teachers is desirable. However, the question remains:

Was the decrease in school and teacher involvement with curriculum implementation per se beyond 1976 a reflection of funding and national direction? Or, is there a saturation factor involved? Are there teachers and schools which cannot be reached even with an implementation program such as Project ASSIST?

Other questions also remain: Is an improvement program such as Project ASSIST limited in its potential when it focuses so exclusively upon curriculum implementation? Are broader parameters more desirable in stimulating general improvement in science teaching? The developments beyond 1976 promise to provide specific information in response to such questions.

The new curriculum developments of the 1970's are drastically different from those of the 1960's. Many of the programs funded in 1970 continue with field testing and initial distribution via regular commercial outlets. The new programs, including USMES, OBIS, HAP, HSP, and ISIS* have been central to the Iowa-ASSIST program since 1976. The program materials and the objectives of the program represent a revolution when compared to the objectives and the resulting materials of the earlier national efforts in the U. S.

Perhaps a quick review of the perceived problems (often used as justification for further funding of national curriculum efforts) will reveal the current status of Iowa-ASSIST as a support mechanism for improving science teaching. The problems of the past national curriculum efforts have been identified by several groups to include: 1) most group centered and teacher directed; 2) overemphasis on "pure" science; 3) no curriculum "sequence" in science; 4) one program for all students; 5) instructional goals not specified; and 6) lack popularity with students.

Recent curriculum developers sought corrections for these problems. They have (and are) developing materials to alleviate the shortcomings and failures of the earlier efforts. The new programs usually have several common features including the following: 1) total instructional system developed;

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*NSF projects cited are: Unified Science and Mathematics for Elementary Schools (USMES), Outdoor Biology Instructional Strategies (OBIS), Health Activities Project (HAP), Human Science Program (HSP), and Individualized Science Instructional System (ISIS).

2) minimum competencies identified in advance; 3) provision for flexibility and student choice; 4) basic units shorter; 5) applied and pure science included; 6) program parts independent; 7) multiple pathways for meeting objectives; 8) activities fit student abilities and interests; 9) no increased costs; and 10) flexible management scheme.

Iowa ASSIST has evolved since its inception. It is no longer restricted primarily as a program for assisting schools with implementing a given national curriculum package. Instead it is concerned with a great variety of activities more closely related to the functions identified in Figure 1 and described earlier. Iowa-ASSIST is a program based at The University of Iowa dedicated to assisting communities, teachers, and students improve programs, perceptions, and their own environments. Perhaps a favorite story will help identify this view.

As many know Sir Christopher Wren was commissioned to build the Cathedral of London. On an occasion Sir Christopher decided to visit with workmen who were busy in the courtyard. He approached three workers -- all involved with the same activity but not in earshot of each other. He asked each the same question, namely "What, sir, are you doing?" The first man responded, "I'm cutting stones." The second responded, "I'm building a wall." The third responded, "I'm helping Sir Christopher Wren build the Cathedral of London!" We need more teachers, more schools, more communities that view their roles beyond a given course, beyond the total school program. We need more who see the ultimate value of their efforts in helping shape the future of all mankind. In a real sense, Iowa-ASSIST is dedicated to the task of producing more "Cathedral builders." It is attempting to cause people to think beyond their own disciplines, their own courses, and even the science curriculum <u>per se</u>. In some sense this goal makes some of the specific effort and some of the results reported here seem inconsequential. As we all assist with curriculum implementation we all must keep the final product, i.e., a functioning human being in tomorrow's world, in clear focus.

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Figure 1

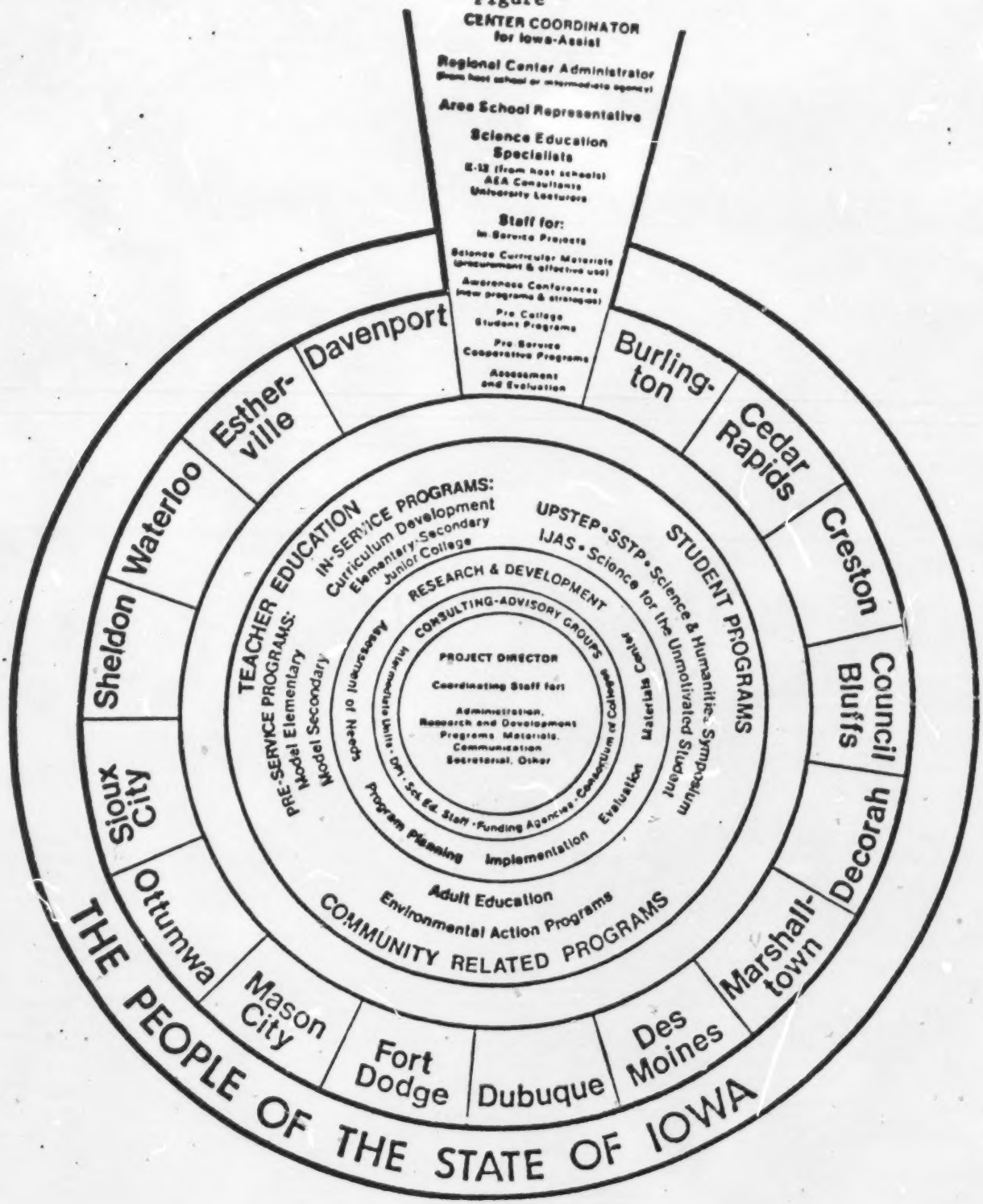

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Table 1

Number of In-Service Teachers Affected

by

Various SEC Programs

YEAR	Regular Extension Courses	Special Campus Based Conferences	Curriculum Revision (UTSTEP)	ASSIST Workshops	ASSIST Awareness Conferences	School Visitations	Campus Visitations	Materials Center	Professional Meetings	Totals
1972-73	103	61	20	251	61	103	15	0	150	764
1973-74	46	63	20	350	173	143	46	10	114	965
1974-75	38	97	20	900	204	200	63	24	258	1804
1975-76	56	104	24	772	311	246	103	58	320	1994
1976-77	32	258	49	474	516	306	211	106	832	2784
TOTALS	275	583	133	2747	1265	998	438	198	1674	8311

Table 2

FOUR YEARS OF SELECTED CURRICULUM IMPLEMENTATION IN IOWA

RESULTING FROM PROJECT ASSIST

Curriculum Project	1972-73			1973-74			1974-75			1975-76		
	Schools Involved	Teachers Enrolled	Students Affected	Schools Involved	Teachers Enrolled	Students Affected	Schools Involved	Teachers Enrolled	Students Affected	Schools Involved	Teachers Enrolled	Student Affecte
Science Curriculum Improvement Study (SCIS)	4	63	1,386	38	308	8,045	83	388	11,640	94	420	11,890
Elementary School Science (ESS)	5	94	1,974	50	344	9,563	73	394	10,976	81	467	13,076
Science: A Process Approach (SAPA)	3	43	1,075	38	272	8,266	52	300	9,300	65	334	9,352
Environmental Studies (ES)	0	0	0	3	5	260	83	195	6,240	148	326	9,780
Others (5 programs)	24	51	1,530	27	74	2,294	51	106	3,342	58	132	4,960
TOTAL	36	251	5,965*	156	1,003	28,428*	342	1,383	41,498*	446	1,679	49,058*

*These figures are mutually exclusive which is not true for teachers and schools. In the latter cases repetition exists both with respect to curriculum effort (vertical) and year (horizontal), and hence the totals are less significant.